

**MHz  
402-406**

**USA/ /11  
MOD**

Allocation to Services		
Region 1	Region 2	Region 3
<b>402-403</b>	METEOROLOGICAL AIDS MOBILE-SATELLITE (space-to-Earth) 648AB METEOROLOGICAL-SATELLITE (Earth-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) Earth Exploration-Satellite (Earth-to-space) Fixed Meteorological-Satellite (Earth-to-space) Mobile except aeronautical mobile 648AA 648AC	
<b>403-406</b>	METEOROLOGICAL AIDS MOBILE-SATELLITE (space-to-Earth) 648AB Fixed Mobile except aeronautical mobile 648AA	
<b>404-406</b>	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile  648	

**Reason:** The Report of the CPM states that additional spectrum will be necessary to meet the near-term requirements for MSS below 1 GHz. As a consequential change of adding primary allocations for the mobile-satellite service in the 401-401.2 and 401.7-404 MHz bands, it is necessary to upgrade the allocations for the meteorological-satellite and Earth exploration-satellite services to co-primary with mobile-satellite service (see also Resolution 710 (WARC-92)).

**USA/ /12  
ADD648AA**

The use of the bands 401-404 MHz by the mobile-satellite service is subject to the application of the coordination and notification procedures set forth in MOD Resolution 46. Until appropriate sharing criteria are developed in the 401- 404 MHz band, stations in the mobile-satellite service shall not cause harmful interference to the meteorological aids, meteorological- satellite, Earth exploration-satellite services, and the space operations service. In accordance with Resolution YYY sharing criteria to facilitate mobile-satellite services in these bands are to be developed as a matter of urgency by the ITU-R and reviewed by the next competent world radiocommunication conference. In making assignments to the space stations of the mobile-satellite service in the 401-404 MHz band, administrations shall take all practical steps to protect the radio astronomy service in the 406.1-410 MHz band from harmful interference from unwanted emissions. Unwanted emissions from mobile-satellite service space stations operating in the 401-404 MHz band shall not cause harmful interference to the mobile-satellite service in the 406-406.1 MHz band (649A applies).

**Reason:** RR648AA to ensure proper sharing criteria is developed by the ITU-R as outlined in Resolution YYY.

**USA/ /13**  
**ADD648AB**

The use of the band 401-404 MHz by the mobile-satellite service is limited to non-geostationary satellite systems.

**Reason:** To ensure that the band is limited to non-geostationary systems.

**USA/ /14**  
**ADD648AC**

In the band 401.7 - 402.4 MHz, the aggregate power flux density produced at the geostationary orbit from transmission from space stations in a mobile satellite service network shall not exceed -162 dBW/m<sup>2</sup> per 4 kHz. In accordance with Resolution YYY this limit is to be reviewed by the ITU-R and may be revised by a future competent world radiocommunication conference.

**Reason:** RR648AC to ensure proper sharing criteria is developed by the ITU-R as outlined in Resolution YYY.

**MHz**  
**455-456**

**USA/ /15**  
**MOD**

Allocation to Services		
Region 1	Region 2	Region 3
<b>455-456</b>	FIXED MOBILE <u>MOBILE-SATELLITE (Earth-to-space) MOD599B 653X</u>	
	653 670	

**Reason:** To make available additional spectrum for MSS systems, in accordance with the Report of the CPM which notes that 7-10 MHz of additional spectrum will be required for MSS below 1 GHz. Footnote MOD599B has been added to clarify that use of this frequency band is limited to use by non-geostationary satellite orbit systems. Footnote 653X has been added to clarify that the coordination and notification procedures of MOD Res. 46 apply to this band.

**MHz**  
**459-460**

**USA/ /16**  
**MOD**

Allocation to Services		
Region 1	Region 2	Region 3
<b>459-460</b>	FIXED MOBILE MOBILE-SATELLITE (Earth- to-space) <u>MOD599B</u> <u>653X</u>	
	653 669 670	

**Reason:** To make available additional spectrum for MSS systems, in accordance with the Report of the CPM which notes that 7-10 MHz of additional spectrum will be required for MSS below 1 GHz. Footnote MOD599B has been added to clarify that use of this frequency band is limited to use by non-geostationary satellite orbit systems. Footnote 653X has been added to clarify that the coordination and notification procedures of MOD Res. 46 apply to this band.

**USA/ /17**  
**ADD**

**653X** The use of the bands 455 - 456 MHz and 459 - 460 MHz by the mobile-satellite service is subject to the application of the coordination and notification procedures set forth in MOD Resolution 46. Mobile earth stations in the mobile-satellite service shall coordinate outside of national boundaries through use of the coordination distance method in Recommendation ITU-R M.[Doc.8/46].

**Reason:** Footnote 653X is necessary to establish the coordination methodology for mobile-satellite systems operating pursuant to new MSS allocations in the 455 - 456 MHz and 459 - 460 MHz bands.

ADD RESOLUTION No. YYY (WRC-95)

Sharing Studies Concerning the Use of the Bands 401- 404 MHz  
by the Mobile-Satellite Service (space-to-Earth)

The World Radiocommunication Conference (Geneva, 1995)

considering

- a) that agenda item 9 of the WRC-95 requested the consideration, inter alia, of allocation of frequency bands to the mobile-satellite service;
- b) that this conference allocated spectrum in the 401-404 MHz band for non-geostationary mobile-satellite service;
- c) that the bands 401-403 MHz and 403-404 MHz are also allocated to the meteorological-satellite, meteorological aids, space operation and Earth exploration satellite services;
- d) that there is a need to determine the operational and technical means to facilitate sharing between the mobile satellite service and the services mentioned in c);
- e) that co-channel sharing between the mobile-satellite service and the meteorological aids service may be difficult;
- f) that RR ADD 648C specifies a maximum power flux density at the geostationary satellite orbit from space stations in the mobile satellite service;

resolves

- 1 that studies be undertaken as a matter of urgency by the ITU-R to develop the operational and technical measures that would facilitate sharing between the mobile satellite service and the services in considering c);
- 2 that the power flux density limit specified in RR ADD 648 AC at the geostationary satellite orbit for networks of the mobile satellite service in the 401.7 – 402.4 MHz band be reviewed and if necessary revised by the ITU-R;
- 3 that studies should also be undertaken to determine the amount of spectrum needed in the 401-406 MHz band for the meteorological aids service in the space-to-Earth direction;
- 4 that the World Meteorological Organization (WMO) be invited to participate in these sharing studies;

invites

- 1 the ITU-R to continue to study, as a matter of urgency, the technical and operational issues relating to the sharing of these bands between the services mentioned in c) above and the mobile-satellite service in the space-to-Earth direction;
- 2 administrations to participate in the development of studies by sending contributions to the ITU-R relating to the aforementioned studies;

3. the ITU-R to bring the results of these studies to the attention of the next competent world radiocommunication conference

instructs the Secretary-General

1. to bring this Resolution to the notice of WMO.

## United States of America

### Proposals for Agenda Item 2.1a

#### MOBILE SATELLITE SERVICES BETWEEN 1 and 3 GHz

The following USA proposal addresses additional allocations for the Mobile Satellite Service (MSS) between 1 and 3 GHz. In developing these proposals the CPM Report to WRC-95 and the work of the ITU-R study groups was taken into account.

As described in the CPM report to WRC-95, the vast interest in the utilization of the MSS bands is evident from the over 250 satellite networks for which advance publication, coordination or notification data has been submitted to the ITU. Currently, world wide MSS allocations between 1 and 3 GHz total 200 MHz, with an additional 90 MHz limited to Region 2. However due to restrictions imposed by sharing these bands with other services, the actual available spectrum to MSS is much less. The CPM report estimates the minimum and likely spectrum requirements for the MSS service will range from 150 MHz to 300 MHz by the year 2005. Taking this into account, the current allocations to MSS are not sufficient to support all the MSS requirements during the period of 2000 - 2005.

The proposal outlined here will provide additional allocations to MSS while continuing to take account of other existing services in the proposed bands. Recognizing the global nature of the MSS service, we are proposing wherever possible allocations on a world-wide basis, which require in some cases realignment of existing Region 2 MSS allocations.

This proposal also incorporates ITU-R recommendations which provide sharing criteria to permit compatible operations between MSS and other radio services. Adoption of these proposals will allow MSS and other radio services to operate more efficiently in shared frequency bands.

## Article 8 of the Radio Regulations

MHz  
1525 - 1530

USA/ 11  
MOD

Allocation to Services		
Region 1	Region 2	Region 3
<b>1525 - 1530</b> SPACE OPERATION (space-to-Earth)  FIXED  <u>MOBILE-SATELLITE</u> (space-to-Earth)  <del>MARITIME</del> <del>MOBILE-SATELLITE</del> (space-to-Earth)  Earth Exploration-Satellite  <del>Land Mobile-Satellite</del> (space-to-Earth) <del>726B</del>  Mobile except aeronautical mobile 724  722 723B 725 726A 726D	<b>1525 - 1530</b> SPACE OPERATION (space-to-Earth)  MOBILE-SATELLITE (space-to-Earth)  Earth Exploration-Satellite  Fixed  Mobile 723  722 723A 726A 726D	<b>1525 - 1530</b> SPACE OPERATION (space-to-Earth)  FIXED  MOBILE-SATELLITE (space-to-Earth)  Earth Exploration-Satellite  Mobile 723 724  722 726A 726D

**Reason:** This modification provides an allocation to the mobile-satellite service instead of the current limitation to maritime and land mobile satellite services. The allocation changes will facilitate the introduction of mobile-satellite services globally. This is in accordance with the VGE recommendation that spectrum be allocated to the most broadly defined services in order to provide maximum flexibility to administrations.

USA/ 12  
SUP

726B

**Reason:** The suppression of Footnote 726B is consequential to the proposed allocation modification.

**MHz**  
**1530 - 1533**

**USA/ 13**  
**MOD**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1530 - 1533</b> SPACE OPERATION (space-to-Earth)  <u>MOBILE-SATELLITE</u> (space-to-Earth)  <del>MARITIME MOBILE</del> <del>SATELLITE</del> <del>(space-to-Earth)</del> <del>LAND MOBILE</del> <del>SATELLITE (space-to-</del> <del>Earth)</del>  Earth Exploration-Satellite Fixed Mobile except aeronautical mobile  722 723B 726A MOD 726C 726D	<b>1530 - 1533</b> SPACE OPERATION (space-to-Earth)  <del>MARITIME MOBILE-SATELLITE (space-to-Earth)</del>  <u>MOBILE-SATELLITE (space-to-Earth)</u>  <del>LAND MOBILE SATELLITE (space-to-Earth)</del>  Earth Exploration-Satellite  Fixed  Mobile 723  722 726A MOD 726C 726D	

**Reason:** This modification provides an allocation to the mobile-satellite service to replace the limited maritime and land mobile satellite service allocation. This will facilitate the introduction of mobile-satellite services globally, and is in accordance with the VGE recommendation that spectrum be allocated to the most broadly defined services in order to provide maximum flexibility to administrations.

**USA/ 14**  
**MOD**

**726C** ~~Additional allocation: in Argentina, Australia, Brazil, Canada, the United States, Malaysia and Mexico, the band 1530 - 1544 MHz is also allocated to the mobile-satellite (space-to-Earth) service, and the band 1626.5 - 1645.5 MHz is also allocated to the mobile-satellite (Earth-to-space) service, on a primary basis subject to the following conditions: The allocation of the bands 1530 - 1544 MHz and 1626.5 - 1645.5 MHz to the mobile-satellite (space-to-Earth) service is subject to the following conditions: the maritime mobile-satellite distress and safety communications shall have priority access and immediate availability over all other mobile-satellite communications operating under this provision. Communications of mobile-satellite system stations not participating in the global maritime distress and safety system (GMDSS) shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services.~~

**Reason:** The modification of Footnote 726C will ensure priority access and immediate availability for maritime distress and safety communications throughout the world while providing the capability



to support additional mobile satellite services.

**MHz**  
**1533 - 1559**

**USA/ 15  
MOD**

Allocation to Services		
Region 1	Region 2	Region 3
<b>1533 - 1535</b> SPACE OPERATION (space-to-Earth)  <del>MARITIME MOBILE SATELLITE (space-to-Earth)</del>  <del>MOBILE-SATELLITE (space-to-Earth)</del>  Earth Exploration-Satellite Fixed Mobile except aeronautical mobile  <del>Land Mobile Satellite (space-to-Earth) 726B</del>  722 723B 726A <u>MOD 726C 726D</u>	<b>1533 - 1535</b> SPACE OPERATION (space-to-Earth)  <del>MARITIME MOBILE SATELLITE (space-to-Earth)</del>  <del>MOBILE-SATELLITE (space-to-Earth)</del>  Earth Exploration-Satellite  Fixed  Mobile 723  <del>Land Mobile Satellite (space-to-Earth) 726B</del>  722 726A MOD 726C 726D	
<b>1535 - 1544</b>	<del>MARITIME MOBILE SATELLITE (space-to-Earth)</del> <del>Land Mobile Satellite (space-to-Earth) 726B</del> <del>MOBILE-SATELLITE (space-to-Earth)</del>  722 726A MOD 726C 726D 727	
<b>1544 - 1545</b>	MOBILE-SATELLITE (space-to-Earth)  722 726D 727 727A	
<b>1545 - 1555</b>	<del>AERONAUTICAL MOBILE SATELLITE (R) (space-to-Earth)</del> <del>MOBILE-SATELLITE (space-to-Earth)</del>  722 726A 726D 727 729 <del>729A</del> 730 <u>MOD 730C</u>	
<b>1555 - 1559</b>	<del>LAND MOBILE SATELLITE (space-to-Earth)</del> <del>MOBILE-SATELLITE (space-to-Earth)</del>  722 726A 726D 727 730 <del>730A 730B</del> MOD 730C	

**Reasons:** These modifications provide an allocation to the mobile-satellite service to replace the limited aeronautical, land, or maritime mobile satellite service allocations. This will facilitate the introduction of mobile-satellite services globally, and is in accordance with the VGE

recommendation that spectrum be allocated to the most broadly defined services in order to provide maximum flexibility to administrations.

USA/ /10  
SUP

729A

**Reason:** The suppression of Footnote 729A is consequential to proposed allocation modifications.

USA/ /11  
SUP

730A

**Reason:** The suppression of Footnote 730A is consequential to proposed allocation modifications.

USA/ /12  
SUP

730B

**Reason:** The alternative allocations in this footnote are reflected in the proposed primary allocations as modified. The footnote is therefore unnecessary.

USA/ /13  
MOD

730C

~~Alternative allocation: in Argentina and the United States the band 1555 - 1559 MHz is allocated to the mobile-satellite (space-to-Earth) service, the band 1656.5 - 1660 MHz is allocated to the mobile-satellite (Earth-to-space) service, and the band 1660 - 1660.5 MHz is allocated to the mobile-satellite (Earth-to-space) and radio astronomy services, on a primary basis subject to the following conditions: In the bands 1545 - 1559 MHz and 1646.5 - 1660.5 MHz, the aeronautical mobile-satellite (R) service shall have priority access and immediate availability over all other mobile-satellite communications within a network operating under this provision; mobile-satellite systems shall be interoperable with the aeronautical mobile-satellite (R) service; account shall be taken of the priority of safety-related communications in the other mobile-satellite services.~~

**Reason:** The modification of Footnote 730C will ensure priority access and immediate availability for aeronautical distress and safety communications throughout the world while providing the capability to support additional mobile satellite services.

USA/ /14  
MOD

731E

The use of the band 1610-1626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to the application of the coordination and notification procedures set forth in MOD Resolution 46 (~~WARC-92~~). A mobile earth station operating in either of the services in this band shall not produce ~~an a peak~~ e.i.r.p. density in excess of -15 dB (W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. 732, unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, a mean value of -3 dB (W/4 kHz) is applicable. ~~Stations of the mobile-satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. 732 and stations in the fixed service operating in accordance with the provisions of No. 730. The provisions of No. 953 apply to the use of the 1610 - 1626.5 MHz band.~~

**Reason:** Inclusion of the terms "peak" and "mean" are to clarify how the e.i.r.p. density limit should be measured. The text proposed for deletion at the end of this provision is unnecessary to protect the primary allocation status of the identified services and creates confusion and ambiguity concerning the primary status of the mobile-satellite service in the 1610-1626.5 MHz band. The addition of text to reference RR953 is to ensure that special measures to avoid harmful interference to safety communications are taken into account.

USA/ /15  
MOD

**733** The bands ~~1610 - 1626.5 MHz~~, 5000 - 5250 MHz and 15.4 - 15.7 GHz are also allocated to the aeronautical mobile-satellite (R) service on a primary basis. Such use is subject to agreement obtained under the procedure set forth in Article 14.

**Reason:** In the band 1 610 - 1 626.5, the aeronautical mobile satellite (R) service reservation contained in this footnote is not required since it is adequately reflected in the primary allocation for mobile satellite service.

**NOTE:** Other modifications to RR 733, in the 5000 -5250 MHz and 15.4 - 15.7 GHz bands, are proposed in other documents. The final footnote would need to reflect all adopted modifications.

**MHz**  
**1626.5 - 1660.5**

Allocation to Services	
Region 1	Region 2
<b>1626.5 - 1631.5</b> <del>MARITIME MOBILE SATELLITE (Earth-to-space)</del> <u>MOBILE-SATELLITE (Earth-to-space)</u> <del>Land Mobile Satellite (Earth-to-space) 726B</del> 722 726A <u>MOD 726C</u> 726D 727 730	<b>1626.5 - 1631.5</b> MOBILE-SATELLITE (Earth-to-space)  722 726A MOD 726C 726D 727 730
<b>1631.5 - 1634.5</b>	<del>MARITIME MOBILE SATELLITE (Earth-to-space)</del> <del>LAND MOBILE SATELLITE (Earth-to-space)</del> <u>MOBILE-SATELLITE (Earth-to-space)</u> 722 726A MOD 726C 726D 727 730 734A
<b>1634.5 - 1645.5</b>	<del>MARITIME MOBILE SATELLITE (Earth-to-space)</del> <del>Land Mobile Satellite (Earth-to-space) 726B</del> MOBILE-SATELLITE (Earth-to-space) 722 726A MOD 726C 726D 727 730
<b>1645.5 - 1646.5</b>	MOBILE-SATELLITE (Earth-to-space) 722 726D 734B

Allocation to Services		
Region 1	Region 2	Region 3
USA/ /20 MOD	1646.5 - 1656.5	MOBILE-SATELLITE (Earth-to-space) <del>AERONAUTICAL MOBILE SATELLITE (R) (Earth-to-space)</del> 722 726A 726D 727 <del>729A</del> 730 MOD 730C 735
USA/ /21 MOD	1656.5 - 1660	MOBILE-SATELLITE (Earth-to-space) <del>LAND MOBILE SATELLITE (Earth-to-space)</del> 722 726A 726D 727 730 730A 730B MOD 730C 734A
USA/ /22 MOD	1660 - 1660.5	RADIO ASTRONOMY <del>LAND MOBILE SATELLITE (Earth-to-space)</del> <del>MOBILE-SATELLITE (Earth-to-space)</del> 722 726A 726D 730A <del>730B</del> MOD 730C 736

**Reasons:** These modifications provide an allocation to the mobile-satellite service to replace the limited aeronautical, land, or maritime mobile satellite service allocations in the 1626.5 - 1660.5 MHz band. This will facilitate the introduction of mobile-satellite services globally and is in accordance with the VGE recommendation that spectrum be allocated to the most broadly defined services in order to provide maximum flexibility to administrations.

USA/ /23  
SUP 734A

**Reason:** This footnote is unnecessary because MOD Resolution 46 provides the notification and coordination procedures that will appropriately handle interference between MSS and Fixed services in these bands.

**MHz**  
**1930 - 2025**

Allocation to Services			
	Region 1	Region 2	Region 3
<b>USA/ /24 MOD</b>	<b><u>1930 - <del>1970</del> 1945</u></b>  FIXED MOBILE  746A	<b><u>1930 - <del>1970</del> 1945</u></b>  FIXED MOBILE <del>Mobile-Satellite</del> ( <del>Earth-to-space</del> ) 746A	<b><u>1930 - <del>1970</del> 1945</u></b>  FIXED MOBILE  746A
<b>USA/ /25 MOD</b>	<b><u>1945 - 1970</u></b> FIXED MOBILE  746A	<b><u>1945 - 1970</u></b> FIXED MOBILE Mobile-Satellite (Earth-to-space) 746A	<b><u>1945 - 1970</u></b> FIXED MOBILE  746A
<b>USA/ /26 MOD</b>	<b><u>1970 - 1980</u></b> FIXED MOBILE  746A	<b><u>1970 - 1980</u></b> FIXED MOBILE <del>MOBILE-SATELLITE</del> <del>Mobile-Satellite</del> (Earth-to-space) 746A MOD 746B 746C	<b><u>1970 - 1980</u></b> FIXED MOBILE  746A
<b>USA/ /27 MOD</b>	<b><u>1980 -1990</u></b> FIXED MOBILE <del>MOBILE-SATELLITE</del> ( <del>Earth-to-space</del> )  746A MOD 746B 746C	<b><u>1980 -1990</u></b> FIXED MOBILE <del>MOBILE-SATELLITE</del> <del>Mobile-Satellite</del> (Earth-to-space) 746A MOD 746B 746C	<b><u>1980 -1990</u></b> FIXED MOBILE <del>MOBILE-SATELLITE</del> ( <del>Earth-to-space</del> )  746A MOD 746B 746C
<b>USA/ /28 MOD</b>	<b><u>1980 1990 - 2010</u></b> FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 746A MOD 746B 746C		
<b>USA/ /29 MOD</b>	<b><u>2010 - 2025</u></b> FIXED MOBILE <del>MOBILE-SATELLITE</del> (Earth-to-space) 746A <u>746D</u>		

**Reasons:** This modification realigns the existing mobile-satellite service allocation and provides an additional allocation to the service on a world-wide basis and is consistent with developing fixed and mobile services. This modification will facilitate the introduction of mobile-satellite services globally and follows the VGE recommendation that spectrum be allocated on a world-wide basis.

USA/ 130  
MOD

**746B** The use of the bands 1970 - 2010 MHz and 2160 - 2200 MHz by the mobile-satellite service shall not commence before 1 January 2005 and is subject to the application of the coordination and notification procedures set forth in **MOD Resolution 46 (WARC-92)**. In the band 2160 - 2200 MHz coordination of space stations of the mobile-satellite service with respect to terrestrial services is required only if the power flux density or Fractional Degradation Percentage produced at the Earth's Surface exceeds the threshold limits in No. 2566, in Recommendation ITU-R IS. [Document 2/6]. In respect of assignments operating in this band, the provisions of Section II, paragraph 2.2 of **MOD Resolution 46 (WARC-92)** shall also be applied to geostationary transmitting space stations with respect to terrestrial stations.

**Reason:** The modification to footnote 746B will facilitate the introduction of mobile-satellite systems in this band by providing updated technical coordination limits.

USA/ 131  
ADD

**746D** The use of the band 2 010 - 2 025 MHz is subject to the application of the coordination and notification procedures set forth in MOD Resolution 46.

**Reason:** Footnote 746D provides the technical basis for use of the 2010 2025 MHz band by the MSS.

**MHz**  
**2160 - 2170**

USA/ 132  
MOD

USA/ 133  
MOD

Allocation of Services		
Region 1	Region 2	Region 3
<b>2160 - 2170 2165</b> FIXED MOBILE  746A	<b>2160 - 2170 2165</b> FIXED MOBILE <del>MOBILE-SATELLITE</del> <u>Mobile-Satellite</u> (space-to-Earth)  746A MOD 746B 746C	<b>2160 - 2170 2165</b> FIXED MOBILE  746A
<b>2165 - 2170</b> FIXED MOBILE <u>MOBILE-SATELLITE</u> (space-to-Earth)  746A MOD 746B	<b>2165 - 2170</b> FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)  746A MOD 746B 746C	<b>2165 - 2170</b> FIXED MOBILE <u>MOBILE-SATELLITE</u> (space-to-Earth)  746A MOD 746B

**Reason:** This modification will provide a world-wide allocation for the mobile-satellite service and

facilitate the introduction of mobile-satellite type services on a global basis. This is in accordance with the VGE recommendation that spectrum be allocated on a world-wide basis.

USA/ 34  
MOD

**753F** The use of the band 2 483.5 - 2 500 MHz by the mobile-satellite service and the radiodetermination-satellite service is subject to the application of the coordination and notification procedures set forth in **MODResolution 46 (WARC-92)**. Coordination of space stations of the mobile-satellite and radiodetermination-satellite services with respect to terrestrial services is required only if the power-flux density produced at the Earth's surface exceeds: ~~the limits in No. 2566.~~

-150 dB (W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 0 and 5° above the horizontal plane;

-150 + 0.65 (δ-5) dB (W/m<sup>2</sup>) in any 4 kHz band for angles of arrival δ (°) between 5 and 25° above the horizontal plane;

-137 dB (W/m<sup>2</sup>) in any 4 kHz band for angles of arrival between 25 and 90° above the horizontal plane.

These limits relate to the power flux-density which would be obtained under assumed free-space conditions. See Recommendation ITU-R IS [Document 2/6]. In respect of assignments operating in this band, the provisions of Section II, paragraph 2.2 of **MODResolution 46 (WARC-92)** shall also be applied to geostationary transmitting space stations with respect to terrestrial stations. Administrations are urged to take all practicable steps to prevent harmful interference to the radio astronomy service from emissions in the 2 483.5 - 2 500 MHz band, especially those caused by second-harmonic radiation that would fall into the 4 990 - 5 000 MHz band allocated exclusively to the radio astronomy service worldwide.

**Reason:** As stated in the CPM-95 report, this modification will reduce the number of coordinations required between the mobile-satellite service and the fixed service, while providing adequate protection to the fixed service systems in this band.

## Section C

### **RECOMMENDED UNITED STATES PROPOSALS**

**Agenda Items 2.1c) & 3d)**

**MSS Feeder Links**



## United States of America

Proposals for Agenda Items 2.1c and 3d

### ALLOCATIONS FOR FEEDER LINKS FOR THE MOBILE-SATELLITE SERVICES

#### Introduction:

The WARC-92 allocated spectrum in the 1.6/2.4 GHz frequency bands for mobile-satellite services. The United States has since licensed three non-geostationary mobile-satellite systems to operate in these frequency bands. Two additional U.S. non-geostationary mobile-satellite systems may also be licensed after January 1996. The first U.S. 1.6/2.4 GHz non-geostationary mobile-satellite launch is expected to occur prior to the WRC-97.

In addition to 1.6/2.4 GHz service link allocations for these mobile-satellite networks, allocations for feeder link operations are necessary. Feeder link networks are needed to complete the service link transmission paths, process the information being transmitted, and interconnect the system with other radiocommunication networks or with other mobile earth stations. Though feeder link earth stations for non-geostationary mobile-satellite systems would operate at fixed locations, and they would operate in frequency bands allocated to the fixed-satellite service according to No. [22], the WRC-95 must allocate specific frequency bands for feeder link networks to operate on a co-primary basis with geostationary fixed-satellite networks and other radiocommunication services.

In preparation for the WRC-95, ITU-Radiocommunication Study Groups and Task Groups have defined spectrum requirements for various non-geostationary mobile-satellite service feeder link networks, identified candidate frequency bands for non-geostationary mobile-satellite service feeder links in the 4 to 8 GHz, 8 to 16 GHz, and 16 to 30 GHz frequency ranges, and evaluated the sharing possibilities with current and future users of the candidate frequency bands. Output from these groups has formed the technical basis for the CPM-95. The United States proposals to modify the international Table of Frequency Allocations in the 4 to 30 GHz range, contained herein, are to support immediate and actual needs of the mobile-satellite service and are based on the output from the CPM-95 and the recommendation by the VGE to simplify the Radio Regulations.

**MHz**  
**4800-5725**

**USA/ /1 MOD**

Allocation To Services		
Region 1	Region 2	Region 3
<b>5000-5250</b> <b>5150</b>	AERONAUTICAL RADIONAVIGATION  MOD 733 [S5.367] MOD 796 [S5.444] MOD 797 [S5.445] <del>797A [S5.446] 797B [S5.447] 797D [S5.447B] 797E [S5.447C]</del>	
<b>5150-5250</b>	AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 797C [S5.447A]  <del>733 [S5.367] 796 [S5.444] 797 [S5.445]</del> MOD 797A [S5.446] MOD 797B [S5.447] <u>797E [S5.447C]</u>	

**Reason:**

Revisions to the Table in the band 5000-5250 MHz are necessary to allocate spectrum specifically for feeder links in the 4 to 8 GHz frequency range to support current and immediate requirements of mobile-satellite services provided from non-geostationary satellite networks. The CPM-95 indicated that studies have shown that co-frequency sharing between microwave landing systems and non-geostationary mobile-satellite service gateway earth stations may be technically feasible. Additionally, the CPM-95, recognizing the safety aspects of microwave landing systems, has recommended that non-geostationary mobile-satellite service feeder links and microwave landing systems should use non-overlapping spectrum. Modification to Nos. 733 [S5.367] 796 [S5.444], 797 [S5.445], 797A [S5.446] and 797B [S5.447] and addition of Nos. 797C [S5.447A], 797D [S5.447B] and 797E [S5.447C] is therefore consequential. A potential paired band in the space-to-Earth direction of transmission could be 6650-7075 MHz.

**NOTE:**

Proposed modification of footnote No. 733 involves frequency bands other than 5000-5250 MHz. In the event that additional proposals are adopted by the Conference which include the modification of No. 733, the final footnote would need to include a combination of all proposals in an amended table of allocations [see Document -E].

**USA/ /2 MOD**

**733 [S5.367]**

The bands ~~1610-1626.5 MHz, 5000-5250~~ 5000-5150 MHz, ~~15.4-15.7~~ 15.4-15.45 GHz, and ~~15.65-15.7~~ GHz are also allocated to the aeronautical mobile-satellite (R) service on a primary basis. Such use is subject to agreement obtained under the procedure set forth in Article 14 [S9].

**Reason:**

In the band 1610-1626.5 MHz, the aeronautical mobile satellite (R) service reservation contained in this footnote is adequately reflected in the primary allocation for mobile satellite service [see also Document -E regarding No. 733 [S5.367]]. Also, the CPM-95 did not identify current use of the 5000-5250 MHz or 15.4-15.7 GHz bands by the aeronautical mobile-satellite (R) service in accordance with No. 733 [S5.367]. Further, the CPM-95 indicated that no sharing studies have been conducted to assess

the feasibility of sharing between the aeronautical mobile-satellite (R) service and non-geostationary mobile-satellite service feeder links in these bands. Therefore, modification of No. 733 [S5.367] permits use by the aeronautical mobile-satellite (R) service in the 5000-5150 MHz, 15.4-15.45 GHz, and 15.65-15.7 GHz bands.

**USA/ /3 MOD  
796 [S5.444]**

The band ~~5000-5250~~ 5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. The requirements of this system shall take precedence over other uses of the 5000-5090 MHz band. In the event that requirements of microwave landing system cannot be met in the 5000-5090 MHz band, future operations of the microwave landing system may extend into the 5090-5150 MHz band. After January 1, 2015, the microwave landing system shall take precedence over other uses of the 5000-5150 MHz band.

**Reason:**

Modification of No. 796 [S5.444] would incorporate the alternative microwave landing system expansion plan discussed internationally, and as indicated by the CPM-95, would articulate the transition plan with initial operations in the 5030-5090 MHz band and subsequent expansion (subject to need) into the 5000-5150 MHz band.

**USA/ /4 MOD  
797 [S5.445]**

The bands ~~5000-5250~~ 5000-5150 MHz, ~~15.4-15.7~~ 15.4-15.45 GHz, and 15.65-15.7 GHz are also allocated to the fixed-satellite service and the inter-satellite service, for connection between one or more earth stations at specified fixed points on the Earth and space stations, when these services are used in conjunction with the aeronautical radionavigation and/or aeronautical mobile (R) service. Such use is subject to agreement obtained under the procedure set forth in Article 14 [S9].

**Reason:**

The CPM-95 did not identify current use of the 5000-5250 MHz band by the fixed-satellite and inter-satellite services used in conjunction with the aeronautical radionavigation service and/or with the aeronautical mobile (R) services in accordance with No. 797 [S5.445]. It indicated further that no sharing studies have been conducted to assess the feasibility of sharing between the non-geostationary mobile-satellite service feeder links and these services in the 5000-5250 MHz band. Therefore, modification of No. 797 [S5.445] permits use by the fixed-satellite and inter-satellite services used in conjunction with the aeronautical radionavigation service and/or with the aeronautical mobile (R) services in the 5000-5150 MHz, 15.4-15.45 GHz, and 15.65-15.7 GHz bands.

**USA/ /5 MOD  
797A [S5.446]**

*Additional Allocation:* in the countries listed in Nos. 733B [S5.369] and 733C [S5.400], and subject to agreement obtained under the procedure set forth in Article 14 [S9], the band 5150-5216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Region 2, the band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in Nos. 733B [S5.369] and 733C [S5.400], the band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service

operating in the bands 1610-1626.5 MHz and/or 2483-2500 MHz. The total power flux-density at the Earth's surface shall in no case exceed -159 dBW/m<sup>2</sup> in any 4kHz band for all angles of arrival.

**Reason:** Modification of No. 797A [S5.446] would be consistent with VGE proposals to simplify the Radio Regulations.

**USA/ /6 MOD  
797B [S5.447]**

*Additional Allocation:* in the Federal Republic of Germany, Austria, Belgium, Denmark, Spain, Finland, France, Greece, Israel, Italy, Japan, Jordan, Lebanon, Liechtenstein, Luxembourg, Malta, Morocco, Norway, Pakistan, the Netherlands, Portugal, the United Kingdom, Sweden, Switzerland, Syria, and Tunisia, the band 5150-5250 is also allocated to the mobile service, on a primary basis and subject to the agreement obtained under the procedure set forth in Article 14 [S9].

**Reason:** Modification of No. 797B [S5.447] would be consistent with VGE proposals to simplify the Radio Regulations.

**USA/ /7 ADD  
797C [S5.447A]**

Use of the band 5150-5250 MHz by the fixed-satellite service in the Earth-to-space direction of transmission is limited to feeder links for non-geostationary satellite systems of the mobile-satellite service (see Resolution XXX). The provisions of No. 2613 [S22.2] do not apply to the fixed-satellite service in the Earth-to-space direction of transmission.

**Reason:** The CPM-95 has indicated that Earth-to-space operation of non-geostationary mobile-satellite service feeder links in the 5000-5250 MHz band may be technically feasible. Therefore, ADD No. 797C [S5.447A] allocates the 5150-5250 MHz band in this specific direction of transmission to the fixed-satellite service and limits the allocation to non-geostationary mobile-satellite service feeder links. The CPM-95 has also indicated that procedural revisions would be necessary to provide a regulatory base which would permit the orderly operation of non-geostationary mobile-satellite service feeder links without any regulatory uncertainties to their full operational life. Consequently, the provisions of No. 2613 [S22.2] would not apply in this band for non-geostationary mobile-satellite service feeder links in the Earth-to-space direction of transmission.

**USA/ /8 ADD  
797D [S5.447B]**

The band 5090-5150 MHz is also allocated to the fixed-satellite service in the Earth-to-space direction of transmission on a primary basis and is limited to feeder links for non-geostationary satellite systems of the mobile-satellite service. The provisions of No. 2613 [S22.2] do not apply to the fixed-satellite service in the Earth-to-space direction of transmission. After January 1, 2010, no new assignments will be made to stations in the fixed-satellite service. After January 1, 2015, existing fixed-satellite service stations will become secondary to stations in the aeronautical radionavigation service and associated safety related systems. Sharing between the fixed-satellite service and aeronautical radionavigation services or associated aeronautical safety systems shall be based on appropriate sharing criteria, including technical and operational constraints, to be developed by the ITU-R and reviewed by a future

competent World Radio Conference (see Resolution XXX). Prior to January 1, 2015, all practicable steps shall be taken to avoid mutual interference between the aeronautical radionavigation service and associated safety related systems and the fixed-satellite service in the band 5090-5150 MHz.

**Reason:** The CPM-95 has indicated that Earth-to-space operation of non-geostationary mobile-satellite service feeder links in the 5000-5250 MHz band may be technically feasible. Therefore, ADD No. 797D [S5.447B] allocates also the 5090-5150 MHz band in this specific direction of transmission to the fixed-satellite service and limits the allocation to non-geostationary mobile-satellite service feeder links. The CPM-95 has also indicated that procedural revisions would be necessary to provide a regulatory base which would permit the orderly operation of non-geostationary mobile-satellite service feeder links without any regulatory uncertainties to their full operational life. Consequently, the provisions of No. 2613 [S22.2] would not apply in this band for non-geostationary mobile-satellite service feeder links in the Earth-to-space direction of transmission.

**USA/ /9 ADD  
797E [S5.447C]**

The use of the band 5090-5250 MHz by the fixed-satellite service in the Earth-to-space direction of transmission is subject to the application of the coordination and notification procedures set forth in MOD Resolution 46.

**Reason:** The application of the coordination and notification procedures set forth in MOD Resolution 46 would be necessary for shared use of the 5090-5250 MHz band by non-geostationary mobile-satellite service feeder links.

**MHz**  
**5725-7300**

USA/ /10 MOD

Allocation To Services		
Region 1	Region 2	Region 3
<b>5925-7075</b>	FIXED FIXED-SATELLITE (Earth-to-space) MOD 792A [S5.441] (space-to-Earth) 809A [S5.458A] MOBILE  791 [S5.440] 809 [S5.458] 809B [S5.458B]	

Reason:

Revisions to the Table in the 5925-7075 MHz band are necessary to allocate spectrum specifically for feeder links in the 4 to 8 GHz frequency range to support current and immediate requirements of mobile-satellite services provided from non-geostationary satellite networks. The CPM-95 indicated that studies have shown that bi-directional spectrum sharing between the geostationary fixed-satellite service and non-geostationary mobile-satellite service feeder link networks is technically feasible given careful site selection and antenna sizing, and depending on the number of gateway earth stations. Modification of No. 792A [S5.441] and addition of Nos. 809A [S5.458A] and 809B [S5.458B] is therefore consequential. The amount of spectrum proposed for the space-to-Earth direction is greater than in the Earth-to-space direction of transmission in the 4 to 8 GHz range because, as indicated by the CPM-95, more than two non-geostationary mobile-satellite service feeder link networks plan to operate in the space-to-Earth direction in the 6650-7075 MHz band. Potentially, two paired bands in the Earth-to-space direction of transmission could be 5000-5250 MHz and 15.4-15.7 GHz.

USA/ /11 MOD  
792A [S5.441]

The use of the bands 4500-4800 MHz (space-to-Earth), 6725-7025 MHz (Earth-to-space), 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space), by the fixed-satellite service shall be in accordance with the provisions of Appendix **30B** [S30B].

Reason:

The CPM-95 indicated that co-directional sharing is not feasible between the geostationary fixed-satellite service and non-geostationary mobile-satellite service feeder links in the frequency bands identified in No. 792A [S5.441]. It did, however, indicate that bi-directional spectrum sharing between the geostationary fixed-satellite service and non-geostationary mobile-satellite service feeder link networks is technically feasible in these bands. MOD 792A [S5.441] would therefore identify the specific direction of transmission for each of the allotment planned bands to which the provisions of Appendix 30B [S30B] would continue to apply and clarify the direction of transmission for each frequency band where bi-directional frequency sharing between the geostationary fixed-satellite service and non-geostationary mobile-satellite service feeder links would be feasible.

USA/ /12 ADD

**809A [S5.458A]**

The band 6650-7075 MHz may also be used by the fixed-satellite service in the space-to-Earth direction of transmission. Use of the band by the fixed-satellite service is limited to feeder links for non-geostationary satellite networks of the mobile-satellite service. The provisions of No. **2613** [S22.2] do not apply to the fixed-satellite service in this band in the space-to-Earth direction of transmission.

**Reason:**

The CPM-95 has indicated that bi-directional sharing between non-geostationary mobile-satellite service feeder links in the space-to-Earth direction and geostationary fixed-satellite service networks operating in the Earth-to-space direction in the 6650-7075 MHz band is technically feasible. Therefore, ADD No. 809A [S5.458A] allocates the 6650-7075 MHz band to the fixed-satellite service in the space-to-Earth direction of transmission and limits the allocation to non-geostationary mobile-satellite service feeder links. The CPM-95 has also indicated that procedural revisions would be necessary to provide a regulatory base which would permit the orderly operation of non-geostationary mobile-satellite service feeder links without any regulatory uncertainties to their full operational life. Consequently, the provisions of No. 2613 [S22.2] would not apply in this band for non-geostationary mobile-satellite service feeder links in the space-to-Earth direction of transmission.

**USA/ 13 ADD  
809B [S5.458B]**

The use of the band 6650-7075 MHz by the fixed satellite service in the space-to-Earth direction of transmission is subject to the application of the coordination and notification procedures set forth in MOD Resolution **46**. Emissions from a non-geostationary space station shall not exceed the power flux-density levels at the Earth's surface as specified in MOD Article **28** [No. S21.16] for the 6650-7075 MHz band. The aggregate of all emissions from a non-geostationary feeder link constellation shall not exceed the power flux-density limit at the geostationary-satellite orbit as specified in ADD No. **2631A** [S22.5A].

**Reason:**

The application of the coordination and notification procedures set forth in MOD Resolution 46 would be necessary for shared, bi-directional use of the 6650-7075 MHz band by non-geostationary mobile-satellite service feeder links. The power flux-density values at the Earth's surface specified in MOD Article 28 [No. S21.16] for the 6650-7075 MHz band would be necessary to protect terrestrial services. The power flux-density limits specified in ADD No. 2631A [S22.5A] would be necessary to protect space stations at the geostationary satellite orbit. [See Document -E for proposals for MOD Article 28 [No. S21.16] and ADD No. 2631A [S22.5A]]

GHz  
10.7-12.75

USA/ /14 MOD

Allocation To Services		
Region 1	Region 2	Region 3
<b>10.7-11.7</b> FIXED FIXED-SATELLITE (space-to-Earth) MOD 792A [S5.441] (Earth-to-space) MOD 835 [S5.484] <u>792B [S5.441A]</u> MOBILE except aeronautical mobile  <u>792C [S5.441B]</u>	<b>10.7 - 11.7</b> FIXED FIXED-SATELLITE (space-to-Earth) MOD 792A [S5.441] <u>(Earth-to-space) 792B [S5.441A]</u> MOBILE except aeronautical mobile  <u>792C [S5.441B]</u>	

**Reason:**

Revisions to the Table in the 10.7-11.7 GHz band are necessary to allocate spectrum specifically for feeder links in the 8 to 16 GHz frequency range to support current and future requirements of mobile-satellite services provided from non-geostationary satellite networks. The CPM-95 indicated that studies have shown that bi-directional spectrum sharing between the geostationary fixed-satellite service and non-geostationary mobile-satellite service feeder link networks is technically feasible given careful site selection and gateway antenna sizing to accommodate systems operating in accordance with Appendix 30B [S30B]. Modification of No. 792A [S5.441] and No. 835 [S5.484] and addition of Nos. 792B [S5.441A] and 792C [S5.441B] is therefore consequential. A potential paired band in the space-to-Earth direction of transmission could be 12.75-13.25 GHz.

USA/ /15 ADD  
792B [S5.441A]

Use of the bands 10.7-10.95 GHz and 11.2-11.45 GHz by the fixed-satellite service in the Earth-to-space direction of transmission is limited to feeder links for non-geostationary satellite networks of the mobile-satellite service except as provided by MOD No. 835 [S5.484]. The provisions of No. 2613 [S22.2] do not apply to the fixed-satellite service in these bands in the Earth-to-space direction of transmission.

**Reason:**

The CPM-95 has indicated that bi-directional sharing between non-geostationary mobile-satellite service feeder links in the Earth-to-space direction and geostationary fixed-satellite service networks operating in the space-to-Earth direction in the 10.7-10.95 GHz and 11.2-11.45 GHz bands is technically feasible. Therefore, ADD No. 792B [S5.441A] allocates the 10.7-10.95 GHz and 11.2-11.45 GHz bands, in the Earth-to-space direction of transmission, to the fixed-satellite service and limits the allocation to non-geostationary mobile-satellite service feeder links with the exception of those feeder links for the broadcasting-satellite service operating in accordance with



MOD No. 835 [S5.484]. The CPM-95 has also indicated that procedural revisions would be necessary to provide a regulatory base which would permit the orderly operation of non-geostationary mobile-satellite service feeder links without any regulatory uncertainties to their full operational life. Consequently, the provisions of No. 2613 [S22.2] would not apply in this band for non-geostationary mobile-satellite service feeder links in the Earth-to-space direction of transmission.

**USA/ /16 ADD  
792C [S5.441B]**

The use of the bands 10.7-10.95 GHz and 11.2-11.45 GHz by the fixed-satellite service in the Earth-to-space direction of transmission is subject to the application of the coordination and notification procedures set forth in MOD Resolution 46.

**Reason:**

The application of the coordination and notification procedures set forth in MOD Resolution 46 would be necessary for shared, bi-directional use of the 10.7-10.95 GHz and 11.2-11.45 GHz bands by non-geostationary mobile-satellite service feeder links.

**USA/ /17 MOD  
835 [S5.484]**

In Region 1, the ~~use of the band~~ 10.7-11.7 GHz by band may also be used by the fixed-satellite service (Earth-to-space) ~~is limited to~~ for feeder links for the broadcasting-satellite service.

**Reason:**

MOD No. 835 [S5.484] would allow for continued use of the 10.7-10.95 GHz and 11.2-11.45 GHz bands by the fixed-satellite service for feeder links for the broadcasting-satellite service in Region 1.